Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	
Implementation of the Local Competition	)	
Provisions in the Telecommunications	)	CC Docket No. 96-98
Act of 1996	)	
	)	
Inter-Carrier Compensation for ISP-Bound	)	CC Docket No. 99-68
Traffic	)	

REPLY COMMENTS OF
WESTERN TELEPHONE INTEGRATED COMMUNICATIONS, INC.

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August 4, 2000

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Western Telephone Integrated Communications, Inc. (Western Telephone), on its own behalf, files these Reply Comments in the above-captioned proceeding.[1]

SUMMARY

ILECs filing in this proceeding support the Commission's *Declaratory Ruling* that held dial-up ISP-bound traffic to be interstate.[2] They urge the Commission to reinstate that decision following the U.S. Court of Appeals remand.[3] As we show below, however, the ILECs fail to mount an effective response to the court's objections. Instead, they largely reassert the same propositions that the Bell Atlantic court rejected. On this record, the Commission has little choice but to reverse course and mandate reciprocal compensation for local ISP traffic.

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[1] "Comment Sought on Remand of the Commission's Reciprocal Compensation Declaratory Ruling by the U.S. Court of Appeals for the D.C. Circuit," Public Notice, FCC 00-227 (released June 23, 2000). Western Telephone has pending state applications for authority to operate as a competitive local exchange carrier (CLEC). In the event of favorable action on its applications, Western Telephone's collection and payment of reciprocal compensation will turn in part on the outcome of this proceeding.

[2] Local Competition Provisions, 14 FCC Rcd 3689 (1999) (*Declaratory Ruling*).

[3] Bell Atlantic Tel. Cos. v. FCC, 206 F.3d 1 (D.C. Cir. 2000).

The *Declaratory Ruling* held that dial-up traffic through an ISP is a single interstate communication from end user to distant website.[4] The Commission reached this conclusion by applying an "end-to-end test" that finds a communication to be interstate if the two ends of the communication are in different states.

This analysis commits the logical fallacy of assuming the point to be proven. The question is whether a customer-ISP-website communication is one call or two. Choice of the end-to-end test implicitly *assumes* one call, whose ends are the customer and the website, so of course the test yields that result.

Moreover, each of the precedents cited by the ILECs for the end-to-end test involves an undisputed single, unbroken communication. The question in those cases is whether a continuous call can be partitioned into intrastate and interstate jurisdictional components. But the question here is whether the call is continuous. Those cases offer no help.

Some ILECs point out other cases involving pre-ISP enhanced service providers (ESPs). The facts in each case lead the Commission to find a single, continuous connection from an end user, through the ESP, to an ultimate destination. Because an ISP is a type of ESP, the ILECs argue, the communication through an ISP must also be a single, continuous connection. This simply does not follow. ESPs vary widely in how they provide service. An ISP is a kind of ESP, to be sure. But it differs in important ways from other kinds of ESPs that connect telephone traffic differently.

Some of the ILECs also advance policy arguments which, they say, demand abolishing reciprocal compensation for ISP traffic and substitution of bill-and-keep or ISP-pays. But any

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[4] *Declaratory Ruling*, 14 FCC Rcd at 3697.

sound policy must acknowledge that a CLEC is entitled to full compensation for the real costs it incurs in terminating an ILEC customer's traffic. Typically the ILEC collects nearly all customer revenues for ISP-bound calls. Bill-and-keep would leave those revenues in the ILEC's pocket, requiring the CLECs to terminate calls for free. ISP-pays would charge the customer twice for the same service, with the ILEC keeping the difference. Neither can be defended as good policy. The Commission recognized as much when it prohibited bill-and-keep, except in cases where the traffic flow is roughly symmetrical.[5] Wisely, it has never even considered an ISP-pays approach -- tantamount to obligatory collect calling.

In the end, however, both the legal disputes and the policy assessments are mostly beside the point. When the Commission ruled that ISP calls are interstate, it mistakenly assumed that an ISP typically passes on a customer request to a distant website. In fact, however, ISPs store, or "cache," copies of their customers' favored websites on their own local servers. A subscriber who requests a website from another state is likely to receive instead a perfect copy from the local cache. And when the cache needs an update, it is the cache itself -- not the customer -- that places the request on the Internet. The vast majority of communications from a customer to an ISP in fact go no farther than the ISP. These calls are wholly local, and hence are fully subject to reciprocal compensation.

DISCUSSION

I. BOTH LEGAL AND POLICY CONSIDERATIONS REQUIRE RECIPROCAL COMPENSATION FOR ISP-BOUND TRAFFIC.

Thirty or so state PUCs have held that Internet access via a dial-up ISP consists of two calls: one from the end user to the ISP over the circuit-switched facilities of the public switched

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[5] 47 C.F.R. Sec. 51.713(b).

telephone network (PSTN), and a second communication from the ISP to the distant website over the private, packet-switched facilities of the Internet. Under this theory, the first call -- end user to local ISP -- is a local call, and is subject to reciprocal compensation.

The Commission's *Declaratory Ruling* rejected the two-call theory.[6] Rather, the Commission held the end-user-to-ISP link to be part of an interstate communication:

> [T]he communications at issue here do not terminate at the ISP's local server . . . but continue to the ultimate destination or destinations, specifically at an Internet website that is often located in another state.[7]

The Commission applied an "end-to-end" analysis that judges a communication to be interstate if the two ends of the communication are in different states. Because it took the two ends of the call to be the ISP's subscriber and the distant web site, the Commission found the entire call is interstate, including the portion between the subscriber and the ISP.

The U.S. Court of Appeals vacated and remanded that decision.[8] Although the Bell Atlantic court did not itself determine that calls to an ISP are local, it put three major obstacles in the way of any other finding. First, the court deemed irrelevant all of the precedents on which the Commission had rested the "end-to-end" analysis it used to find that ISP calls are interstate.[9] Second, the court questioned the use of a jurisdictional test to determine whether a call is local for reciprocal compensation purposes.[10] Use of the end-to-end analysis for this purpose

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[6] *Declaratory Ruling* (dial-up access). *See also* GTE Telephone Operating Cos., 13 FCC Rcd 22466 (1998) (xDSL access).

[7] *Declaratory Ruling*, 14 FCC Rcd at 3697 (footnoted omitted).

[8] Bell Atlantic Tel. Cos. v. FCC, 206 F.3d 1 (D.C. Cir. 2000).

[9] Bell Atlantic v. FCC, 206 F.3d at 6.

[10] Bell Atlantic v. FCC, 206 F.3d at 5.

particularly troubled the court, because it covers over the problem of whether and how the call maintains its identity in transitioning across the ISP modem from a circuit-switched call to the packet-switched Internet.[11] Third, the court pointed to a statutory framework that admits only two kinds of local exchange service: exchange access, which connects the caller to an interexchange carrier; and telephone exchange service, which connects the caller to another local subscriber.[12] The court doubted that ISP traffic could be exchange access;[13] but if it is not, then ISP traffic is necessarily telephone exchange service, which no one doubts is subject to reciprocal compensation.

A. ILEC Support of the End-to-End Test Commits a Logical Fallacy.

The Commission cited two cases to support application of the end-to-end test. Each involves a real-time telephone call over a continuous switched circuit: a voice mail user retrieving messages;[14] and an 800 service.[15] No party to either case disputed the existence of a single, connected communication. Rather, both cases raised the question whether that single communication could be partitioned into intrastate and interstate segments for jurisdictional purposes. Because each call was continuous, the Commission looked to the ends of the call, rather than intermediate points, to establish jurisdiction.

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[11] Bell Atlantic v. FCC, 206 F.3d at 5.

[12] Bell Atlantic v. FCC, 206 F.3d at 8. *See* 47 U.S.C. Secs. 153(16), (47).

[13] Bell Atlantic v. FCC, 206 F.3d at 8-9.

[14] BellSouth Memory Call, 7 FCC Rcd 1619 (1992).

[15] Teleconnect Co. v. Bell Telephone Co., 10 FCC Rcd 1626 (1995), *aff'd sub nom.* Southwestern Bell Tel. Co. v. FCC, 116 F.3d 593 (D.C. Cir. 1997).

In resolving whether reciprocal compensation applies to an ISP call, the existence of a single communication from end user to website is *not* a given. To the contrary, it is precisely the question to be decided. But applying the end-to-end test, with the two ends identified as the user and the website, implicitly *assumes* the call between them is continuous. The answer that results from the test -- a single interstate communication -- thus is merely a consequence of choosing that test, since the test cannot possibly give any other answer.

The argument commits the logical fallacy of assuming the point to be proven. Logicians since Aristotle and Euclid have universally condemned this fallacy, known as *petitio principii* or "begging the question." The end-to-end test has no place in this controversy.

B. There Is No Valid Precedent For the Proposition that ISP Calls Are Interstate.

The Bell Atlantic court distinguished away the two precedents on which the Commission relied for the end-to-end test as "not on point."[16] The court held:

> Both [cases] involved a single continuous communication, originated by an end-user, switched by a long-distance communications carrier, and eventually delivered to its destination.[17]

The ILECs reassert the facts and holdings of the two cases, but they fail to address the court's objections.[18] Specifically, the ILECs fail to reconcile the single, unbroken connection in BellSouth Memory Call and Teleconnect with the discontinuity in service and technology that occurs at an ISP.

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[16] Bell Atlantic v. FCC, 206 F.3d at 6. The cases cited are Teleconnect Co. v. Bell Telephone Co., 10 FCC Rcd 1626 (1995), *aff'd sub nom.* Southwestern Bell Tel. Co. v. FCC, 116 F.3d 593 (D.C. Cir. 1997); and BellSouth Memory Call, 7 FCC Rcd 1619 (1992).

[17] Bell Atlantic v. FCC, 206 F.3d at 6.

[18] *E.g.*, Verizon at 6; Qwest at 7-9.

Instead, the ILECs try to buttress their position with citations to other Commission cases that deal with particular ESPs.[19] The facts in each case lead the Commission to find a single, continuous connection from an end user, through the ESP, to an ultimate destination.[20] Because an ISP is a sub-species of ESP, the ILECs argue, those cases compel a finding that the communication through an ISP must likewise be a single, continuous connection.

Stripped to its essentials, the argument makes no sense at all. The evidence teacher Irving Younger once lampooned this line of reasoning as follows: A candlestick is cylindrical and gives light; a broomstick is cylindrical; therefore, a broomstick gives light. *An ISP can be a category of ESP, yet differ from other kinds of ESPs in ways that make particular precedents inapplicable.* The cases cited here all involve conventional voice telephone service connected through an ESP, what the Bell Atlantic court calls "a single continuous communication."[21] Application of an end-to-end test in those cases is hardly precedent for the factually very different case of an ISP that connects a circuit-switched call on the PSTN to the private packet-switched Internet backbone.

Some of the ILECs try other analogies. In the days before equal access for long-distance service, Qwest recalls, some subscribers had to dial a long-distance carrier, enter a billing code, receive a second dial tone, and then dial the destination number.[22] This was a single interstate call, despite being dialed in stages, but it was hardly "precisely analogous" to ISP calls, as Qwest

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[19] *E.g.* Verizon at 7 n.16, 8 n.20; Qwest at 10-11; NECA at 2 n.7.

[20] The cases cited for this proposition include MTS and WATS Market Structure, 97 F.C.C. 2d 682, 711 ¶ 78 (1983); Amendments of Part 69 of the Commission's Rules Relating to Enhanced Service Providers, 2 FCC Rcd 4305, 4306 ¶ 7 (1987); Amendments of Part 69 of the Commission's Rules Relating to Enhanced Service Providers, 3 FCC Rcd 2631, 2631, ¶ 2 (1988); Access Charge Reform, 12 FCC Rcd 15982, 16131-32, ¶ 341 (1997).

[21] Bell Atlantic v. FCC, 206 F.3d at 6.

[22] Qwest at 6-7. *See also* BellSouth at 17

maintains.[23] To the contrary, this is just another case, like BellSouth Memory Call or Teleconnect, that (unlike ISP service) resulted in a single continuous communication from end-user to destination.[24] SBC goes far afield to a case that affirmed Commission jurisdiction over an intrastate telephone link delivering out-of-state TV signals to an in-state cable system.[25] SBC cites the case in support of the end-to-end test.[26] But the court itself took a different view. The court emphasized the anomaly of denying Commission authority over an instrumentality connecting two services -- TV and cable -- that are both within plenary federal jurisdiction.[27] Some ILECs cite also GTE Telephone Operating Cos.,[28] which held Internet service via DSL to be interstate. But the factual and legal divide between conventional dial-up and DSL is so broad that the Commission itself made a point of denying the decision had any bearing on dial-up reciprocal compensation.[29]

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[23] Qwest at 6.

[24] Bell Atlantic v. FCC, 206 F.3d at 6.

[25] General Telephone Co. v. FCC, 413 F.2d 390 (D.C. Cir. 1969), *cert. denied*, 90 S. Ct. 173, 178 (1969).

[26] SBC at 14.

[27] To deny Commission jurisdiction, said the court, would be "a particularly sterile result when the carrier activity is augmenting the operations of parties which are the particular concern of the Commission's regulatory responsibility." General Telephone Co. v. FCC, 413 F.2d at 402.

[28] 13 FCC Rcd 22466 (1998). *See* Verizon at 7 n.16, 8 n.20

[29] "Unlike GTE's ADSL tariff, the reciprocal compensation controversy [for circuit-switched dial-up traffic] implicates: the applicability of the separate body of Commission rules and precedent regarding switched access service, the applicability of any rules and policies relating to inter-carrier compensation when more than one local exchange carrier transmits a call from an end user to an ISP, and the applicability of interconnection agreements under Section 251 and 252 of the Communications Act . . . . Because of these considerations, *we find that this Order does not, and cannot, determine whether reciprocal compensation is owed . . . .*" GTE

In short, none of the prior decisions marshaled by the ILECs compels a finding that ISP calls are interstate. None of those decisions even supports such a holding.

C. ISP Calls Are Necessarily Telephone Exchange Service.

The Commission "brushed aside" the question whether ISP-bound traffic is telephone exchange service or exchange access.[30] Now the ILECs brush aside the same question again, calling it "simply not relevant."[31]

But the court's concern is not so easily dismissed. The plain language of the Communications Act partitions the universe of local exchange service into just two categories:

> The term "local exchange carrier" means any person that is engaged in the provision of *telephone exchange service* or *exchange access*.[32]

The first category, telephone exchange service, connects the user to another local user.[33] The second, exchange access, connects the user to an interexchange carrier so the user can place or receive a long-distance call.[34]

Telephone Operating Cos., 13 FCC Rcd at 22467 (emphasis added).

[30] Bell Atlantic v. FCC, 206 F.3d at 4-5.

[31] BellSouth at 8. *See also* Verizon at 10, Qwest at 12, SBC at 22, USTA at 6-7.

[32] 47 U.S.C. Sec. 153(26) (emphasis added).

[33] "The term 'telephone exchange service' means (A) service within a telephone exchange, or within a connected system of telephone exchanges within the same exchange area operated to furnish to subscribers intercommunicating service of the character ordinarily furnished by a single exchange, and which is covered by the exchange service charge, or (B) comparable service provided through a system of switches, transmission equipment, or other facilities (or combination thereof) by which a subscriber can originate and terminate a telecommunications service." 47 U.S.C. Sec. 153(47).

[34] "The term 'exchange access' means the offering of access to telephone exchange services or facilities for the purpose of the origination or termination of telephone toll services." 47 U.S.C. Sec. 153(16)

The wording of the statute makes these two categories exhaustive. The call from an end user to an ISP must be one or the other. Congress left no room for fanciful third categories like Qwest's "information access."[35] The Bell Atlantic court doubted an ISP call could be exchange access, because that necessarily originates or terminates telephone toll services[36] -- something an ordinary ISP does not do. Rather, the court seemed to think the only viable option is the Hobson's choice of telephone exchange service.[37] That would place the ISP call squarely within the reach of reciprocal compensation.

The ILECs vigorously resist this conclusion. Several point to the so-called "ESP exemption" from access charges.[38] Argues BellSouth: "[I]f the [ISP] connections were not access there would be no need for an 'exemption' in the first place."[39] This is another candlestick-and-broomstick error. Even if *some* ESPs do use the network in ways that might otherwise subject them to access charges, that does not establish that *all* ESPs -- particularly ISPs -- use the network that way. In fact, as the court recognized, ISPs do not.[40] They have no need for an ESP exemption from access charges, because they would not be subject to access charges

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[35] Qwest at 13.

[36] Bell Atlantic v. FCC, 206 F.3d at 9.

[37] Bell Atlantic v. FCC, 206 F.3d at 9.

[38] Qwest at 10-11; BellSouth at 16; SBC at 24-28; USTA at 5-6.

[39] BellSouth at 16. *See also Declaratory Ruling*, 14 FCC Rcd at 3700 ("That the Commission exempted ESPs from access charges indicates its understanding that ESPs in fact use interstate access service; otherwise the exemption would not be necessary.") (emphasis in original; footnote omitted).

[40] "ISPs connect to the local network 'for the purpose of' providing information services, not originating or terminating telephone toll services." Bell Atlantic v. FCC, 206 F.3d at 9 (quoting with approval from brief of MCI WorldCom).

in any event. The mere fact of the exemption does nothing to establish that ISPs provide exchange access.

Some ILECs try to reason from the Commission's ruling in Advanced Telecommunications Services.[41] That decision held xDSL service is either telephone exchange service or exchange access, depending on how it is used, and so triggers the ILECs' Section 251 obligations. The decision includes a shorthand paraphrase of the statute that describes exchange access as "originating or terminating communications that travel outside the exchange."[42] Seizing on the paraphrase (and ignoring the statute), Verizon argues that ISP communications travel outside the exchange, and therefore must be exchange access.[43] But the statute says something quite different. To be exchange access, a service must originate or terminate telephone toll services.[44] The statutory language simply does not permit Verizon's interpretation. Even the Commission, whose construction is otherwise entitled to judicial deference,[45] cannot substitute its own words for those of an unambiguous statute.[46]

In short, the statute divides local exchange service into telephone exchange service and exchange access. Traffic destined for an ISP must be one or the other of these. It cannot be

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41 15 FCC Rcd 385 (1999). *See* Verizon at 9-10; BellSouth at 8.

42 Advanced Services, 15 FCC Rcd at 391, para. 15.

43 Verizon at 9-10. *See also* BellSouth at 8; SBC at 17 (different paraphrase; same result).

44 47 U.S.C. Sec. 153(16) (quoted above).

45 Bell Atlantic v. FCC, 206 F.3d at 9.

46 "If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress." Chevron U.S.A. v. Natural Resources Defense Council, Inc., 467 U.S. 837, 842-43 (1984).

exchange access, which the statute specifies as connection to telephone toll services. Therefore, it must be telephone exchange service, which is subject to reciprocal compensation.

D. Policy Considerations Require Application of Reciprocal Compensation to ISP Traffic.

Some of the ILECs argue at length that reciprocal compensation for ISP traffic drains ILECs, subsidizes CLECs, discourages competition, distorts pricing, skews investment, impairs rural Internet service, hinders deployment of advanced services, promotes waste, and encourages scams.[47] The Commission should arrest these harms, say the ILECs, by excluding ISP traffic from reciprocal compensation.

These parties fail to acknowledge that a CLEC delivering traffic to an ISP incurs real costs, and is entitled to full compensation. The substitution of bill-and-keep, as some ILECs request, would deny that compensation.[48] The ILECs oppose reciprocal compensation for ISP traffic because the volume of ISP-bound calls from the ILEC's customers to the CLEC's customers exceeds the volume the other way. Under bill-and-keep, however, the same asymmetry will leave CLECs largely uncompensated for the costs of terminating ILECs-originated traffic, while the ILECs pocket payment for both ends of the call. The Commission foresaw this problem, which is why it specifically limited bill-and-keep to cases where the flow of traffic between carriers is roughly equal in both directions.[49] That rule makes bill-and-keep impermissible for ISPs.

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[47] *E.g.*, Verizon at 11-22; SBC at 39-47.

[48] *E.g.*, SBC at 49-51.

[49] 47 C.F.R. Sec. 51.713(b).

Equally impermissible is the proposal of some ILECs to require CLECs to recover their costs by charging ISP subscribers for calls *received*.[50] Every call to an ISP would become a collect call.

From its earliest days, telephony has operated on a sent-paid basis. Long-standing domestic interconnection arrangements, not to mention the international settlements structure, accommodate this basic fact of economic life. Closer to home, the proposal would cause the ISP's subscriber to pay twice for the same service, with the overcharge going to the ILEC. The subscriber would pay the usual ILEC bill, which includes fair compensation for handling both ends of the ISP call. But the customer would also have to reimburse the ISP for the CLEC's costs, and so pay for the same service again.

The ILECs claim to oppose reciprocal compensation as a matter of public policy, but their proposed remedies belie that concern. Whether framed as bill-and-keep or ISP-pays, the remedy would yield unearned revenue for the ILEC, at the expense of the CLEC or ISP. This is not sound policy, but merely a cynical effort to exploit a facilities-based monopoly in defiance of Congress's pro-competitive goals.

II. THE VAST MAJORITY OF SUCCESSFUL INTERNET CALLS ACTUALLY STOP AT THE ISP.

When an end user requests and receives a distant website from an ISP, is that one call or two? The Commission has one answer; the Court of Appeals suggests another. But each begins with the same image: a customer dialing an ISP, which passes on the call to the target website in another state. The authorities disagree only on how to interpret the events this image portrays.

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[50] Verizon 22-23; Qwest at 17; BellSouth at 3-4.

But the image is wrong. Most times, an ISP does *not* hand off a user's call to the Internet, but responds to it locally. The Commission's preconception was indeed accurate in the early days of public Internet access, but not any more.

All modern ISPs cache copies of their customers' favored websites on their own local servers.[51] A customer who requests a distant website is likely to receive instead a perfect copy from the local cache. The reason is simple economics. Customers tend to return to the same sites; and it costs less to store a site for several weeks than to transport it across the country once.[52]

Well-designed multiple caching servers can, within one network, handle well over 60% of arriving requests from local storage.[53] In the remaining cases, where the cache lacks an up-to-date copy of the requested site, the cache itself puts a request onto the Internet. The website responds to the cache, which stores the response, and only then forwards a copy to the customer. In all of these cases, the customer's call to the ISP in fact stops at the ISP.

Communications between the cache and the website come from the cache and use the cache's own Internet address -- not the customer's. They remain wholly within the Internet. Often these communications occur with no customer request at all -- as when a website's preset shelf life has expired, or when the website operator "pushes" an updated copy into the ISP's cache. Although cache-to-website communications are interstate, they travel only over the

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[51] The sole exceptions are the very smallest ISPs -- those without enough customer traffic to fill their first T-1 data line. Once an ISP reaches that level of demand, it is far less expensive for the ISP to add caching than to upgrade the data line. As a result, the vast majority of end users are served by ISPs that do use caching.

[52] Paul DeVeaux, *Cache Me If You Can*, America's Network, July 1, 1999, at 34.

[53] Based on actual traffic measurement by CDS Networks, Inc., during June 2000.

private Internet backbone. Not being calls handed off between LEC's, they do not affect inter-carrier compensation. Indeed, they never use the PSTN.

In short, nearly all end-user calls that reach an ISP with caching facilities in fact go no farther. These calls are wholly local, and hence are fully subject to reciprocal compensation.

The only Internet applications that routinely transit the ISP onto the Internet are chat and instant messaging.[54] These are text-based, and in addition are inherently slow, limited by the end user's typing speed. Accordingly, they represent but a tiny fraction of an ISP's data payload.[55] No doubt the ILECs will seize on these applications as "proof" that ISP calls connect directly to interstate locations. But even if the Commission's one-call model properly applied to chat and instant messaging -- a view not shared by any other forum -- this is hardly the "substantial portion of Internet traffic" to interstate locations the *Declaratory Ruling* requires. Relative to the vast majority of ISP traffic, interstate bits are the rare exception.[56]

The ILECs have strenuously pressed the supposed unfairness of applying reciprocal compensation to ISP calls. Yet, nowhere do the ILEC's mention the one fact -- ISP caching -- that makes ISP calls unarguably local. To the contrary, the ILECs deliberately perpetuate the

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[54] Email waits at the ISP for later transmission, and may have to wait again at intermediate servers along the way. Sometimes these waits are short, and the transmission seems almost instantaneous. But delays of several hours are not uncommon.

[55] Even a fast typist at a steady 100 words per minute generates only 80 bits/second. This is about 1/700 times the speed of website graphics downloading over an ordinary dial-up connection. In actual practice, chat and instant messaging traffic tends to be sparse, intermittent, and far slower.

[56] Michael A. Goulde of Inktomi Corporation notes that calling up data from specific websites is similar to having everyone to fly to Hollywood to see the latest movie instead of sending copies of the film to theaters across the country where it can be viewed by thousands at once. Jim Thompson, *Caching Technology*, Boardwatch, Feb. 2000, at 79.

long-obsolete image of an ISP routinely sending customer calls out onto the Internet.[57] These statements to the Commission are especially troubling because all major ISPs, including those of the ILECs themselves, use local caching. The ILECs can hardly claim ignorance of the technology. And yet, even though they know that customer calls to their own ISPs in fact stop there, they tell the Commission that ISPs served by CLECs work differently.

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Our first-round comments explained in detail why caching is not only economically beneficial to ISPs, but has become essential to the modern Internet. We provide only a brief summary here, and refer the Commission to our July 21 filing for specifics.

Reduction of ISP costs As noted, storing a site for later use by a customer is much less expensive than fetching it repeatedly. The cost advantages are increasing sharply. The average cost of hard-drive space is about one cent per megabyte in 2000, and is falling by half each year.[58] The benefits of storage increase as the Internet grows, with the consequence that more users access an ever-shrinking percentage of total websites. Indeed, millions of less sophisticated

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[57] "Calls to the Internet simply transit the ISP location on their way to their ultimate destination." Verizon at 6. "The [subscriber's] call is transmitted by the subscriber's local telephone company to the ISP, where the ISP then connects the subscriber to the ISP's web server." Qwest at 6. "The information an ISP subscriber passes on to the ISP is analogous to the signaling information that an end user passes to an interexchange carrier. In both cases the information is used to direct the communication to the appropriate end location which in the case of an Internet communication is generally a distant web site." BellSouth at 7. "Telecommunications sent to an ISP does not terminate at the ISP for the simple reason that it is transmitted from the ISP server to subscriber-designated destinations on the Internet." SBC at 19.

[58] *See* http://www.sciam.com/2000/0500issue/0500toig.html (from a recent issue of *Scientific American*).

Internet users newly coming on line tend to stay with the same handful of commercial sites they find in the major portal services.

Relief of Internet congestion. Even if bandwidth costs were not a factor, extensive caching would still be needed to avoid bottlenecks at the remote server or remote router interconnection points. Ultimately, local storage is needed because the number of Internet users is increasing much faster than the number of servers. In the language of the Internet, the center cannot otherwise keep up with demand at the edges.

Improved response times. Caching results in much faster responses to customer mouse-clicks. An ISP can fetch a site from cache and put it on the customer's screen in about one-tenth the time it takes to access the site from across the Internet. Fast-changing websites such as news, weather, and sports services can use a process called "Evergreen" that caches a site's unvarying graphic content -- logos, borders, pictures, etc., which account for most of the bandwidth -- while updating only new content, largely low-bandwidth text. Ninety percent of the page may come from long-held storage in local cache, even though a story is updated frequently. The much-discussed e-commerce explosion encourages caching of web pages and forms, with only user-specific information and typed-in text actually crossing the Internet. A new technology called "Footprint Secure" permits even secure sites, such as those used for credit card payments, to be cached at the edge of the Internet.[59]

Management of broadband capability. Broadband access technologies such as DSL and cable modems increase typical download speeds by a factor of 20 or more, enabling users to click on correspondingly more sites in the time they now take to inspect one. This level of demand

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[59] *See* http://www.digitalisland.com/news/press/fpsecure.shtml.

would paralyze the backbone without adequate caching to buffer the load. Broadband also makes possible new Internet services, such as high-quality video and games, which will add to the demand for caching. High-bandwidth applications such as streaming audio and video in fact show the greatest cost benefit from caching.

Timely distribution of content. Some content providers keep pre-loaded caches close by the point of request (edge of the Internet) to ease the strain on their Internet servers. Content providers, in addition to ISPs, can choose material to be cached at the ISPs' facilities. An emerging industry sells cache network services that parallel the heaviest traffic on the Internet, gaining speed by avoiding the congested "peering points" that connect constituent networks.[60] The more sophisticated systems operate in multi-tiered layers, with centralized master caches transmitting updated material by satellite to local caches at the ISP. Content providers pay these services to deliver material to ISPs because it reaches the end user more quickly and reliably than via a conventional Internet connection, and hence generates more customer response.

Increase in ISP revenue. Content network services pay ISPs to cache material locally, to ensure fastest access by the end user. As zero-monthly-charge ISP service becomes more commonplace, revenues from caching networks will become a growing proportion of ISP income, and caching will continue to increase accordingly.

CONCLUSION

The end-to-end test is not helpful in determining whether ISP calls are interstate, because application of the test assumes that result. Nor are the cases cited by the ILECs any more useful. One category of cases, typified by BellSouth Memory Call and Teleconnect, examines a

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[60] Peter Christy and John Katsaros, *Broadband Access Shifting Business Values in the Internet Power to the ISP*, Telecom Business, April 2000, at 26

communication everyone agrees is one call, and holds it cannot be partitioned into intrastate and interstate segments. The other category holds that various configurations making continuous connections through an ESP each add up to one interstate call. None of the cases compels a decision that an ESP making a very different kind of connection -- namely, an ISP -- is likewise part of a single interstate call.

Separately, the ILECs resist the statutory division of local exchange service into telephone exchange service and exchange access, because they dislike the end result. The ILECs want to keep ISPs out of telephone exchange service, because that is subject to reciprocal compensation. But the only other option, exchange access, entails connection to telephone toll service, which is not part of ISP service. Some ILECs argue that ISPs provide exchange access because they are ESPs, which are exempt from paying access charges. No doubt some ESPs need that exemption, but ISPs do not provide exchange access and would not pay access charges in any event.

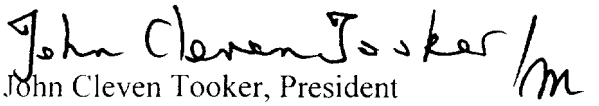
The ILECs also raise policy arguments against reciprocal compensation for ISP traffic. But they overlook the plain fact that a CLEC delivering an ILEC customer's traffic to an ISP incurs real costs, and is entitled to full reimbursement. That is why Congress imposed reciprocal compensation. The substitution of bill-and-keep or ISP-pays, as the ILECs request, would have the ILECs pocket nearly all of the customer revenues for both ends of the call while the customer pays twice. For just this reason the Commission limited bill-and-keep to cases of symmetrical traffic flow.

In any event, both the Commission and the Court of Appeals are working from a wrong fact. The Commission found ISP calls to be interstate because it believed that an ISP routinely passes on customer requests to the Internet. In fact, an ISP responds to most customer requests

from a local cache. Sometimes the cache must initiate an Internet communication, but it does so from the cache's Internet address, not the customer's, and may not even be tied to a specific customer request. Most ISP calls in fact are local.

Both the law and the facts require that reciprocal compensation be applied to ISP-bound traffic just as it is to local voice calls.

Respectfully submitted,



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